

Notice of Allowability

Application No.

10/658,933

Examiner

Cuong V. Luu

Applicant(s)

PIERRAT ET AL.

Art Unit

2128

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 2/15/2007.
2. ☒ The allowed claim(s) is/are 2,3,6 and 7.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____


KAMINI SHAH
SUPERVISORY PATENT EXAMINER

DETAILED ACTION

Claims 2-3 and 6-7 are pending. Claims 1, 4-5, and 8 have been canceled. Claims 2-3 and 6-7 have been examined. Claims 2-3 and 6-7 have been allowed.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with attorney Jeanette Harms on 3/8/2007.

The application has been amended as follows:

1. The paragraph 0001 on page 1 of the specification has been amended as following:

[0001] The present application is a divisional of U.S. Patent Application Serial No. 09/746,369, now U.S. Patent 6,653,026 B1, filed by Christophe Pierrat and Youping Zhang on December 20, 2000.

2. As per claim 2, it has been amended as following:

A computer-readable medium embodying instructions that when executed by a processor would provide a tool set for simulating a tri-tone attenuated phase-shifting mask including a plurality of structures, a subset of the structures including a transparent region, an opaque region, and an

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attenuated region, wherein the opaque region and the attenuated region form a rim, the tool set comprising:

means for analyzing optical proximity correction for the subset of the structures; and

means for providing a same rim width in the subset of the structures, wherein the means for providing includes:

means for dividing a first edge of the attenuated region into a plurality of first segments;

means for dividing a second edge of the opaque region into a plurality of second segments, wherein each second segment corresponds to a certain first segment; and

means for determining whether a second segment moves with its corresponding first segment during optical proximity correction; and

means for generating a layout consistent with the means for providing.

3. As per claim 3, it has been amended as following:

A computer-readable medium embodying instructions that when executed by a processor would provide a tool set for simulating a tri-tone attenuated phase-shifting mask including a plurality of structures, a subset of the structures including a transparent region, an opaque region, and an attenuated region, wherein the opaque region and the attenuated region form a rim, the tool set comprising:

means for analyzing optical proximity correction for the subset of the structures; and

means for providing a same rim width in the subset of the structures, wherein the means for providing includes:

means for downsizing the attenuated region and then upsizing the attenuated region to generate the same rim width; and

means for generating a layout consistent with the means for providing.

4. As per claim 6, it has been amended as following:

A computer-readable medium embodying instructions that when executed by a processor would provide a tool set to convert an integrated circuit layout into an attenuated phase-shifting mask layout for fabricating the integrated circuit, the tool set comprising:

means for identifying a subset of structures in the integrated circuit layout;

means for converting the subset of structures into the mask layout, wherein each converted structure includes a transparent region, an opaque region, and an attenuated region, wherein the opaque region and the attenuated region form a rim; means for analyzing optical proximity correction for a plurality of converted structures; and

means for providing a same rim width for the plurality of converted structures, wherein the means for providing includes:

means for dividing a first edge of the attenuated region into a plurality of first segments;

means for dividing a second edge of the opaque region into a plurality of second segments, wherein each second segment corresponds to a certain first segment; and

means for determining whether a second segment moves with its corresponding first segment during optical proximity correction; and

means for generating a layout consistent with the means for providing.

5. As per claim 7, it has been amended as following:

A computer-readable medium embodying instructions that when executed by a processor would provide a tool set to convert an integrated circuit layout into an attenuated phase-shifting mask layout for fabricating the integrated circuit, the tool set comprising:

means for identifying a subset of structures in the integrated circuit layout;

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means for converting the subset of structures into the mask layout, wherein each converted structure includes a transparent region, an opaque region, and an attenuated region, wherein the opaque region and the attenuated region form a rim;

means for analyzing optical proximity correction for a plurality of converted structures; and

means for providing a same rim width for the plurality of converted structures, wherein the means for providing includes:

means for downsizing the attenuated region and then upsizing the attenuated region to generate the same rim width; and

means for generating a layout consistent with the means for providing.

Allowable Subject Matter

Claims 2-3 and 6-7 are allowed. The following is a statement of reasons for the indication of allowable subject matter:

6. As per claim 2, the prior art, Kachwala, teaches a tool set for simulating a tri-tone attenuated phase-shifting mask including a plurality of structures, a subset of the structures including a transparent region, an opaque region, and an attenuated region, wherein the opaque region and the attenuated region form a rim (the abstract), the tool set comprising:

means for analyzing optical proximity correction for the subset of the structures; and

means for providing a same rim width in the subset of the structures based on edges provided by the means for analyzing;

means for dividing a first edge of the attenuated region into a plurality of first segments;

means for generating a layout;

but does not teach:

means for dividing a second edge of the opaque region into a plurality of second segments, wherein each second segment corresponds to a certain first segment; and

means for determining whether a second segment moves with its corresponding first segment during optical proximity correction as recited in the claim invention

7. As per claim 3, the prior art, Kachwala, teaches a tool set for simulating a tri-tone attenuated phase-shifting mask including a plurality of structures, a subset of the structures including a transparent region, an opaque region, and an attenuated region, wherein the opaque region and the attenuated region form a rim (the abstract), the tool set comprising:

means for analyzing optical proximity correction for the subset of the structures; and

means for providing a same rim width in the subset of the structures;

means for generating a layout;

but does not teach:

wherein the means for providing includes means for downsizing the attenuated region and then upsizing the attenuated region to generate the substantially similar rim width as recited in the claim invention.

8. As per claim 6, the prior art, Kachwala, teaches a tool set to convert an integrated circuit layout into an attenuated phase-shifting mask layout for fabricating the integrated circuit, the tool set comprising:

means for identifying a subset of structures in the integrated circuit layout;

means for converting the subset of structures into the mask layout, wherein each converted structure includes a transparent region, an opaque region, and an attenuated region, wherein the opaque region and the attenuated region form a rim;

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means for analyzing optical proximity correction for a plurality of converted structures;
and
means for providing a same rim width for the plurality of converted structures;
means for dividing a first edge of the attenuated region into a plurality of first segments;
means for generating a layout;
but does not teach:
means for dividing a second edge of the opaque region into a plurality of second segments, wherein each second segment corresponds to a certain first segment; and
means for determining whether a second segment moves with its corresponding first segment during optical proximity correction
as recited in the claim invention.

9. As per claim 7, the prior art, Kachwala, teaches a tool set to convert an integrated circuit layout into an attenuated phase-shifting mask layout for fabricating the integrated circuit, the tool set comprising:
- means for identifying a subset of structures in the integrated circuit layout;
means for converting the subset of structures into the mask layout, wherein each converted structure includes a transparent region, an opaque region, and an attenuated region, wherein the opaque region and the attenuated region form a rim;
means for analyzing optical proximity correction for a plurality of converted structures;
and
means for providing a same rim width for the plurality of converted structures;
means for generating a layout;
but does not teach:

wherein the means for providing includes means for downsizing the attenuated region and then upsizing the attenuated region to generate the same rim width; as recited in the claim invention.


Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cuong V. Luu whose telephone number is 571-272-8572. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah, can be reached on 571-272-2279. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. An inquiry of a general nature or relating to the status of this application should be directed to the TC2100 Group receptionist: 571-272-2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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